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Compaq Computer Corporation

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Server Consolidation with Compaq ProLiant Servers

The advantages of logical, physical and rational consolidation

Abstract: This document addresses the benefits of server consolidation on industry standard ProLiant servers. Server consolidation is an industry trend that involves the optimization of physical resources, the consolidation of applications onto fewer, more powerful servers and centralizing the management of business critical applications.

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Introduction to Server Consolidation

The IT Balancing Act

The act of balancing many problems simultaneously forces IT organizations to be reactive, ultimately spiraling costs out of control

Many IT professionals find themselves carefully balancing many problems simultaneously, in an attempt to prevent systems and productivity from crashing down. Forced to respond to the disparate needs of the many departments they support, IT specialists often struggle to meet the requests of their organization. A common method of reacting to changing demands involves adding equipment. This procedure often solves immediate problems, but later reveals unforeseen consequences. Like a clumsy dance, this balancing act tends to trickle down to one common industry problem – out of control costs.

The Trend towards Standards

Server consolidation stems from the acceptance of industry standard systems and the need to reduce the total cost of ownership

Industry wide trends reveal that most major corporations are migrating from custom designed, proprietary platforms to more economical, standardized systems running fewer operating systems. Beyond the obvious cost savings are powerful benefits such as highly expandable systems and easy to use shrink-wrapped applications. These trends stem from IT organizations' growing need to reduce the total cost of ownership of servers, storage and labor while maximizing processing power. Together, these trends have led to the demand for highly available consolidated systems that enhance the ability to respond to new business challenges.

Server Consolidation Defined – From Many to Few

Server consolidation involves optimizing resources to increase staff productivity and reduce labor requirements, reducing total costs. Placing systems at core locations enables IT organizations to effectively respond to emerging business challenges, simplifies data management, reduces space requirements and helps control the overall cost of ownership. As the world's largest computer supplier of Industry Standard computing platforms, Compaq is able to provide the most reliable and cost-effective server consolidation solutions. Compaq servers lead the industry in reliability, are designed for optimal space utilization, and include tools that empower IT staffers with the ultimate in manageability.

The primary benefits of consolidation involve reducing costs and increasing reliable access to data and computing resources. Server consolidation can help contain the following costs:

- Personnel productivity: centralized server management leverages precious IT resources, improves response times, and decreases server down-time
- Data control and security: server consolidation provides more consistent and reliable access to data
- Hardware costs: equipment standardization leads to economies of scale as maintaining smaller numbers of servers reduces overall hardware costs
- Software licensing fees: reducing the number of servers required to support clients means fewer application licensing fees

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Server Consolidation – Three Types

The Gartner Group identifies three different styles of server consolidation: logical, physical and rational as tactical and workable consolidation solutions.

Logical consolidation is many to few consoles, physical consolidation is many to few locations and rational consolidation is many to few servers

Logical consolidation: adopting tools that provide a centralized mechanism for managing a set of applications. It provides operations consistency, improves application and infrastructure reliability, increases security and leverages precious IT talent as a business grows.

Physical consolidation: reducing the number of server and storage locations to reduce operational costs. Also includes reducing the number of servers and storage devices required to accomplish an organization's computing needs. Additionally, physical consolidation includes standardizing on a storage environment, such as the Compaq StorageWorks Enterprise Network Storage Architecture, to simplify day-to-day storage management, improve economies of scale for storage purchases and easily accommodate changing business needs.

Rational consolidation: the consolidation of applications onto fewer, more powerful servers. Rational consolidation reduces hardware and software expenses as well as operational overhead.

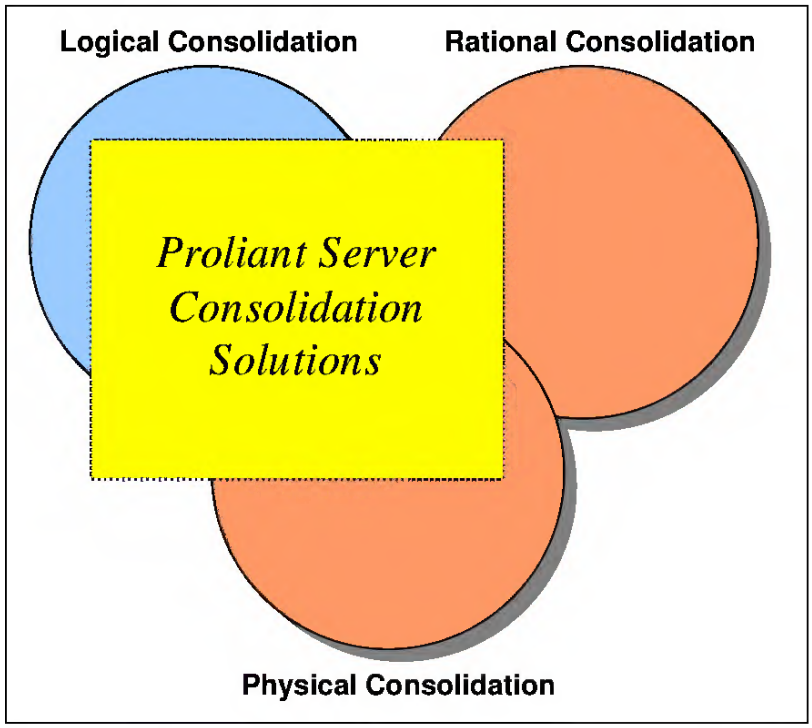

Figure 1: ProLiant server consolidation solutions address the various levels of consolidation to different degrees.

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Logical Consolidation

Corporations that rely on business critical applications may benefit from application management capabilities, a core feature of logical consolidation

Organizations that may benefit from logical consolidation rely on business critical applications such as ERP, business intelligence, e-commerce, Internet, Intranet, mail and collaboration products. These applications are often difficult to control and benefit from management applications that ease their administration and reduce downtime. With logical consolidation, application management tools improve application availability, significantly reduce downtime and decrease IT labor costs. Logical consolidation centralizes IT support staff and gives them the ability to manage centrally located or distributed applications. Additionally, logical consolidation automates tasks and applies application management across many systems at once to resolve common problems such as disk space utilization and software updates.

Benefits of Logical Consolidation

The valuable benefits of logical consolidation include:

- Extended uptime: by proactively monitoring system resources and solving application problems before they fail.
- Increased administrator productivity: by automating and centralizing tasks, making it easier to maintain or improve network, systems and application performance.
- Reduced total cost of ownership: by minimizing the number of man hours required to perform installations, upgrades and application management.
- Improved application availability: by reducing planned and unplanned downtime, assuring users access to network and computing resources.
- Enhanced data management capabilities: by centralizing administration of data used in mission critical applications.

Tradeoffs of Logical Consolidation

Management software costs, installation labor and time are all factors that can inhibit a management application installation

Research has revealed that any tradeoffs of logical consolidation can be offset if a proper solution is implemented. The primary challenges of installing application management tools include the material costs of the management software, the labor required to install the solution and the time needed to fully implement a solution. An installation can take months to fully implement and IT staffers must be trained to fully utilize the functionality of management tools. Fortunately Compaq logical consolidation solutions, as revealed in a major study conducted by IDC, realize a return on investment in an average of only 77 days.

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Benefits of Using Compaq for Rational Consolidation

Compaqs partnerships with major independent software vendors such as BMC, CA, Tivolli and others, coupled with powerful Compaq products help you plan, deploy and operate application management tools. Additional benefits include:

- Compaq Insight Manager integrates with major network frameworks, enabling IT staff to control many applications from a single console. This powerful tool keeps your applications highly available by proactively predicating failure of critical system resources and aids in the planning and installation of applications across multiple servers and workstations.
- Compaqs "Active Answers" empowers administrators with unparalleled access to information that can aid in the management of major applications. See http://www.compaq.com/activeanswers/ for more information.

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Physical Consolidation

Physical consolidation involves two types of consolidation: systems and storage. The benefits and tradeoffs of each are unique and described as follows:

SYSTEMS CONSOLIDATION

Corporations with physically dispersed computing resources may benefit from consolidating and updating systems into fewer locations to ease physical systems management and reduce overall expenses

Organizations that may benefit from systems consolidation often have applications and servers in separate departments, rooms and even buildings across the globe. As systems become more distributed, managing, repairing and upgrading them becomes more difficult and costly. Corporations need to carefully weigh the business benefits of distribution in light of the cost benefits of consolidation. With systems consolidation, corporations rework and upgrade their network so that resources are located in a smaller number of locations. Consolidating systems enables enterprise management of physical resources from fewer locations, quick identification and resolution of problems and it can significantly reduce overall expenses. In addition, the installation of newer hardware and software can increase performance, capacity and fault-tolerance of the entire infrastructure.

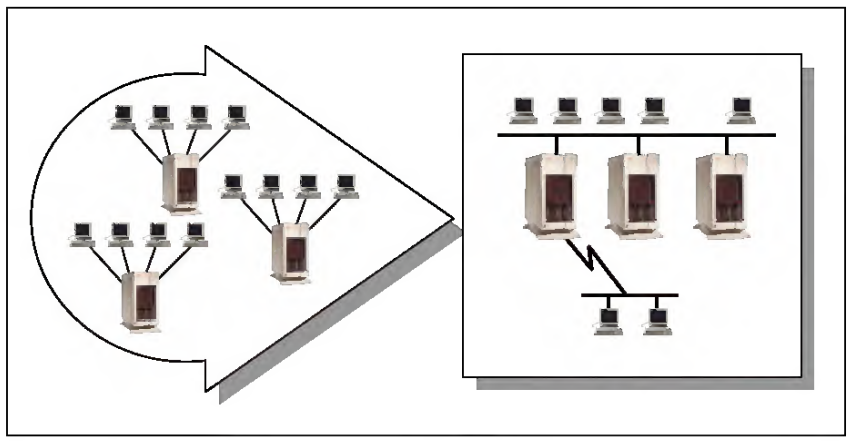

Figure 2: Before and after systems consolidation

Benefits of Systems Consolidation

Consolidating and upgrading systems and resources into fewer locations provides significant benefits, including:

- Reduced costs: as a function of fewer systems performing greater tasks.
- Increased physical security: enabling all hardware to be locked and monitored in fewer locations.
- Improved data security: as the number of platforms decrease, the access to data can be monitored more effectively.
- Increased administrator productivity: as engineers spend more time on server related issues and less time on non-server administrative functions, such as traveling to remote sites to trouble shoot and upgrade systems.
- Enhanced reaction time: and proactive monitoring of systems allows administrators to quickly solve problems, significantly reducing downtime.

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- Simplified upgrade procedures: is a function of systems in fewer locations, reducing staffing requirements.
- Improved capacity planning: as applications may be run from fewer servers in centralized locations.
- Increased network performance: as closer physical proximity of servers enables high-speed connections among servers and to the network.
- Efficient use of floor space: enabling multiple servers to be stacked in a single rack.

Tradeoffs of Systems Consolidation

Organizations that are distributed by design, such as retail chains, may not realize significant cost saving with systems consolidation

There are some situations where systems consolidation may not be cost effective. For example, if an organization's servers are supporting extremely remote locations (such as U.S. based servers supporting locations in Asia-Pacific regions of the world), network infrastructure costs may outweigh the benefits of consolidation. In addition, organizations that are distributed by design, such as retail chains, may benefit by distributing computing resources while centralizing the management of those resources.

There are general tradeoffs for nearly all organizations implementing server consolidation. Significant up-front expenditures may be required to redesign the corporate network architecture. In addition, centralizing physical equipment opens a corporation to greater risks in disaster situations. Additionally, when downtime does occur, it may affect a larger number of users. Clustering and other fault tolerant features can help increase the high availability of data. Finally, the administration staff should be prepared for increased need for telephone support from remote users.

Benefits of Using Compaq for Systems Consolidation

As the largest manufacturer of Intel based industry standard servers, Compaq has the broadest array of services and support for your systems consolidation efforts

An important reason to consider Compaq for your consolidation needs and upgrade efforts is the completeness with which Compaq can satisfy your needs. Compaq manufactures the industry's most compact, expandable and complete line of Intel-based servers. Compaq also has professional services to provide configuration consulting and implementation of your solution. Compaq consolidation solutions also include system management tools. Compaq can partner with you during each step of planning, design and implementation to ensure the success of your consolidation effort. Additional benefits include:

- Compaq Servers are rack optimized for the data center, enabling up to 14 servers to be stacked in a rack that occupies only 5.5 square feet of floor space. ProLiant workgroup servers start at 5.25 inches (3U) tall and ProLiant 4-processor enterprise servers start at only 7 inches (4U) in height.
- The Compaq Smart Start installation tool decreases the time required to install and upgrade servers. This automated tool surveys systems and configurations, enabling easy manageability of upgrades.
- Compaq Insight Manager can manage an unlimited number of servers from a single console. This powerful application keeps your data available by proactively predicating failure of critical system components, such as CPU, memory and hard drives. Compaq will cross ship components under warranty that are predicted to fail.

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- The Compaq Network and Systems Integration Services team will help you plan your consolidation efforts, assuring a smooth and cost efficient implementation.

STORAGE CONSOLIDATION

Corporations with dedicated storage pools for each server in their network may benefit from storage consolidations highly available and manageable features

Organizations that benefit from storage consolidation, a form of physical consolidation, often have a dedicated and rapidly growing storage capacity for each server in their network. Whether servers are centralized or distributed, dedicated disk and tape volumes deter data sharing, complicate information security, make backups more difficult to administer, and greatly increase the cost and complexity of growing a storage farm. As the importance and volume of data grows, continuous access becomes critical and data management becomes more complex. Storage consolidation provides pools of highly available, flexible and centrally managed storage that can be distributed to provide the performance and availability demanded by applications. In addition, storage consolidation enables organizations to better manage growth, control security and information access, and it provides rapid response to changing business demands.

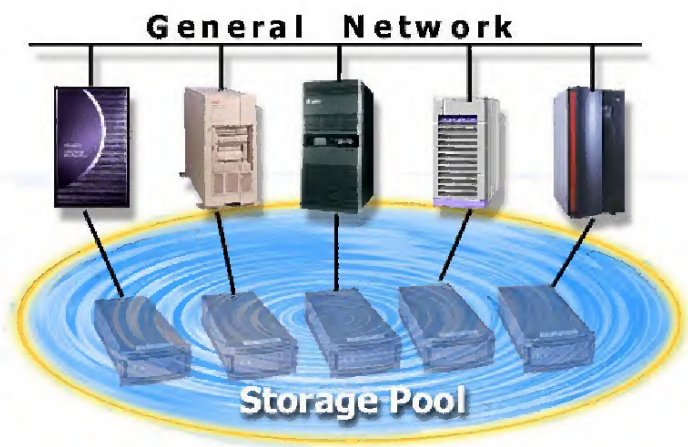

Figure 3: Storage Consolidation allows multiple servers to access a shared storage repository

Benefits of Storage Consolidation

Storage consolidation provides numerous benefits to organizations, including:

- Highly scaleable storage: enabling administrators to manage growth and quickly respond to changing business needs.
- Highly available and fault tolerant storage: providing continuous and reliable access to data.
- Improved data management: and protection from consolidated storage.
- Increased storage utilization: from allocating storage via a centrally managed pool of storage.
- Reduced administrative costs: and time required to troubleshoot problems.
- Platform independence: enabling sharing of data and simplified backup procedures.

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Tradeoffs of Storage Consolidation

With consolidated storage, issues such as disaster recovery, network reconfiguration and financial planning need to be considered

Storage consolidation's numerous benefits also include a few notable tradeoffs. It is important to consider disaster recovery scenarios when data is centralized to a single location. In addition, storage engineering and application configuration expertise is required to adequately analyze network performance requirements. Storage consolidation may require a significant initial cash outlay to procure large RAID units as opposed to simply adding hard drives to a system. In addition, existing investments in RAID and tape backup may become obsolete as they are replaced by larger arrays and automated tape backup libraries.

Benefits of Using Compaq for Storage Consolidation

As the world's largest storage supplier, Compaqs high availability, high capacity and high performance solutions will meet the needs from desktop to data center

A primary reason to consider Compaq for your storage consolidation efforts is that Compaq is the world's largest storage supplier. Compaq is also the only storage vendor that ensures high availability and reliability, high capacity and high performance storage, with solutions for applications ranging from the desktop to the data center. Other benefits include:

- Compaq's Enterprise Network Storage Architecture (ENSA) provides a highly flexible environment for data storage capacity and management. This advanced technology creates "virtual disks" from a large pool of consolidated storage. The storage pool is physically distributed as business needs require. With ENSA, a storage pool can consist of a number of small, relatively inexpensive "array controllers" that are deployed as needed. Storage growth is granular down to a disk drive. In addition, ENSA preserves much of today's storage hardware investment. Only ENSA offers the range of configuration, performance tuning, monitoring and data protection capabilities needed to unify an enterprise storage environment. ENSA is also designed to grow as business needs require, while maximizing the protection of your existing storage investments.
- StorageWorks Command Console, a Windows NT based monitoring and configuration tool, can manage up to 1.2 petabytes of data distributed across an enterprise from a single workstation. Its easy to use features include failure notification, reliability monitoring and multiple levels of security.

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Rational Consolidation

Corporations experiencing dramatic expansion and growth often benefit from consolidating workload tasks into fewer, more powerful systems and applications

Organizations well suited for rational consolidation have experienced dramatic growth that resulted in complex solutions for workload related tasks. Situations such as corporate mergers and global expansions create redundant, incompatible workgroup practices, including financial applications, office productivity tools, intranet applications, e-mail and customer management applications. Rational consolidation merges different workgroup applications onto standardized enterprise applications, running on fewer and larger servers, optimizing labor usage and reducing overall costs.

Rational Consolidation Example

In 1995, Digital Equipment Corporation evaluated its global staffing and equipment requirements for its e-mail application servers. The company found there were 700 staffers attending to mail servers around the globe. After consolidating on a single e-mail application, Digital was able to eliminate nearly fifty percent of its e-mail servers and reduce dedicated support staff to 200. In 1997, the company handled 50 million messages per day at a cost thirty-five percent less than it did in 1995.

Benefits of Rational Consolidation

The many benefits of rational consolidation include:

- Increased administrator productivity: by standardizing on fewer servers and reducing the number of applications that are required.
- Reorganization of complementary resources: into a singular workflow environment (e.g. order entry and general ledger).
- Decreased downtime: in a centralized single application environment because problem-resolution capable staff are locally accessible.
- Reduced application licensing fees: as a single application replaces the workload of many applications.
- Increased resource utilization: in large scale global environments because fewer servers are operating for longer periods of time, as opposed to many servers being under-utilized.
- Reduced total cost per user: as a function of decreased hardware, software and overhead expenses.

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Tradeoffs of Rational Consolidation

When consolidating workloads, equipment must be highly fault tolerant and plans must be made to reduce planned and unplanned downtime

Consolidating workload activities presents notable tradeoffs that must be appropriately planned for. A major challenge when centralizing workloads is the requirement for increased fault tolerance. A failure or even planned downtime in a consolidated environment can affect a great number of individuals and have an adverse effect on the productivity of an entire organization. Equipment must be highly reliable and fault tolerant to minimize failures. Organizations considering rational consolidation need a plan to deal with backup and planned downtime. In addition, rational consolidation may place a larger burden on the staff supporting remote users. Additionally, as a function of current operating systems, the ProLiant platform has limited capabilities when operating multiple applications on a single server. Compaq AlphaServer and Himalaya platforms may be better suited for more intensive rational consolidation efforts. The net benefit of any rational consolidation effort is a streamlined IT infrastructure that can better leverage the IT staff while assuring greater reliability for the users and lower capital costs for the corporation.

Benefits of Using Compaq for Rational Consolidation

A principal reason to use Compaq for all of your rational consolidation is Compaqs industry leadership in fault tolerant solutions. With applications that can predict component failure and redundant components such as storage controllers, power, fans and hard drives, Compaq provides the fault tolerance demanded for rational consolidation. Additional benefits include:

- Compaqs "Active Answers" empowers administrators with unparalleled access to information that can aid in the planning, deployment, operation and trouble shooting of popular applications ranging from Oracle databases to SAP. See http://www.compaq.com/activeanswers/ for more information.
- Compaq provides services to aid in the consolidation to a standard platform. These professional services include business critical assistance with high availability planning as well as network and systems integration services.
- Compaqs hardware and software makes up the industry's most powerful and standardized solutions for your rational consolidation efforts. Highly scaleable and rack mountable, Compaq servers can handle up to 1 terabyte of storage each, can contain multiple processors, extensive memory and an array of networking equipment. Investing in a Compaq solution is a secure way to assure that you can grow problem free for years to come.
- Compaq Capital, Compaq's in-house financial services unit, can finance up to100 percent of the Compaq solution, including hardware, software, and services. Afterwards, Compaq Capital's financial asset management services can help reduce the total cost of owning technology, while **Trade In Programs, Tech Refresh Options** and **Equipment Disposal Services** ensure that your implementation meets your business needs, -- even as those needs change.

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Summary

Forced to respond to the disparate needs of the many departments they support, IT staffs often struggle to meet the needs of their organization. Industry trends have revealed a demand for centrally managed highly available systems that reduce administration costs and enhance the ability to respond to new business challenges. Server consolidation meets these needs head-on by consolidating operations to reduce total costs.

There are three types of consolidation efforts that address unique concerns within a typical IT department: logical, physical and rational. Logical consolidation is the centralization of application management tasks to increase uptime and IT staff productivity. Physical consolidation consists of two types of material consolidation, systems and storage. Systems consolidation is the centralization and updating of server resources to fewer locations to reduce operational costs. Storage consolidation is the standardization on a disk and tape storage platform to reduce operational overhead and increase data availability. Rational consolidation is the consolidation of applications onto fewer, more powerful servers, to curtail hardware and software expenses as well as operational overhead. Together, these three categories of consolidation can significantly reduce costs and increase a corporations overall productivity levels.

Compaq Computer Corporation is well positioned to meet all of your server consolidation requirements. As the market leader of Intel based industry standard servers, Compaq offers an unparalleled array of services and equipment to aid in your consolidation efforts. If you need absolute reliability, Compaq has computing platforms and solutions that can meet your needs. Regain control of your enterprise by contacting your authorized Compaq value added reseller today or visiting Compaq on the world-wide web at http://www.compaq.com.

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